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G03F 7/004(21)Application number : **2000-189544**(71)Applicant : **FUJI PHOTO FILM CO LTD**(22)Date of filing : **23.06.2000**(72)Inventor : **YANAKA HIROMITSU**
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AKIYAMA KEIJI**(54) ORIGINAL FILM FOR LITHOGRAPHIC PRINTING****(57)Abstract:**

PROBLEM TO BE SOLVED: To provide an original film for lithographic printing which can be fitted for printing directly on a printing press without being processed after exposure and which has an excellent on-press developability and, besides, a high plate wear.

SOLUTION: The original film has a heat-sensitive layer containing microcapsules containing a hydrophobic resin on a substrate having a hydrophilic surface. The hydrophobic resin has two or more atom groups contributing to the cohesive energy by 10 kJ/mol or above in the minimum repetition unit thereof.

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CLAIMS

[Claim(s)]

[Claim 1] The original edition for lithography to which it is the original edition for lithography which has a sensible-heat layer containing the microcapsule which connotes a hydrophobic resin on the base material which has a hydrophilic front face, and this hydrophobic resin is characterized by cohesive-energy contribution having two or more 10 kJ(s)/mol [more than] atomic groups in the minimum repeat unit.

[Claim 2] The original edition for lithography according to claim 1 characterized by this hydrophobic resin being at least one resin chosen from an epoxy resin, phenol resin, polyester resin, a polyurethane resin, melamine resin, polyamide resin, alkyd resin, a xylene resin, a urea-resin, and hydroxy styrene resin.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the negative for lithography of the base material which has a hydrophilic front face, and the negative mold which has a hydrophilic image formation layer. It is related with the negative [the platemaking by the scanning exposure based on the digital signal is possible, and] for lithography which can give in more detail the printed matter which does not have printing dirt at ****-proof [high sensitivity and quantity].

[0002]

[Description of the Prior Art] Much researches are made about the lithographic plate for computer two-plate systems with progress remarkable in recent years. As what aims at solution of much more process rationalization and a waste fluid processing problem, without carrying out a development, after exposure, the negative for lithography which equips a printing machine with as it is and which can be printed is studied, and various methods are proposed in it.

[0003] There is a method called on-board development which removes the non-picture section of the original edition for printing by supplying dampening water and ink, equipping the cylinder of a printing machine with the original edition [finishing / exposure] for printing, and rotating a cylinder to one of the methods which loses down stream processing. That is, it is the method which equips a printing machine with as it is and which processing completes in the usual printing process after exposing the original edition for printing. For the negative for lithography suitable for such on-board development to have a meltable photosensitive layer in dampening water or an ink solvent, and to have the Ming room handling nature suitable for moreover negatives being developed on the printing machine put on the Ming room is needed.

[0004] For example, the negative for lithography which prepared the photosensitive layer which distributed the particle of a thermoplastic hydrophobic polymer in hydrophilic binder polymer on the hydrophilic base material is indicated by Japanese JP,2938397,B. After carrying out infrared-laser exposure, making this official report coalesce with heat and carrying out image formation of the particle of a thermoplastic hydrophobic polymer to it in this negative for lithography, a version is attached on a printing machine cylinder and it is indicated that on-board development can be carried out in dampening water and/or ink.

[0005] Moreover, producing the printing version by on-board development after coalesce according a thermoplastic particle to heat also in JP,9-127683,A and WO No. 10186 [99 to] official report is indicated.

[0006]

[Problem(s) to be Solved by the Invention] However, although the method of making a picture from mere coalesce of the particle by the above heat showed good on-board development nature, since picture intensity was weak, it had the problem that ****-proof was inadequate. Therefore, the purpose of this invention is solving this problem, and is having good on-board development nature and offering the negative for lithography of ****-proof [quantity] moreover.

[0007]

[Means for Solving the Problem] Wholeheartedly, as a result of examination, by using a hydrophobic resin with the high cohesive force between molecules for a microcapsule endocyst object, this invention person found out that high ****-proof was obtained, and resulted in this invention. That is, this invention is as follows.

[0008] 1. The original edition for lithography to which it is the original edition for lithography which has sensible-heat layer containing microcapsule which connotes hydrophobic resin on base material which has hydrophilic front face, and this hydrophobic resin is characterized by cohesive-energy contribution having two or more 10 kJ(s)/mol [more than] atomic groups in the minimum repeat unit.

[0009] 2. The original edition for lithography of one aforementioned publication characterized by this hydrophobic resin being at least one resin chosen from epoxy resin, phenol resin, polyester resin, polyurethane resin, melamine resin, polyamide resin, alkyd resin, xylene resin, urea-resin, and hydroxy styrene resin.

[0010]

[Embodiments of the Invention] this invention is explained in detail below.

[0011] The original edition for lithography of this invention has a sensible-heat layer containing the microcapsule which connotes a hydrophobic resin on the base material which has a hydrophilic front face. This hydrophobic resin is characterized by the cohesive-energy contribution value by Fendors having two or more 10 kJ(s)/mol [more than] atomic groups in the minimum repeat unit of the structure. The cohesive-energy contribution value by cohesive-energy contribution and Fendors of an atomic group is indicated by D.W.Krevelen work, Properties of Polymers, the 3rd edition, Elsevier (1997), and p.189-200, for example.

[0012] As an example of an atomic group with cohesive-energy contribution of 10 kJ(s)/more than mol, a hydroxyl group, a carboxyl group, a cyano group, a phenyl group, a carbonyl group, a carboxyl group, a urethane bond, urea combination, ureido combination, ether linkage, ester combination, amide combination, etc. are mentioned.

[0013] As an example of a hydrophobic resin in which cohesive-energy contribution has two or more 10 kJ(s)/mol [more than] atomic groups per minimum repeat unit, an epoxy resin, phenol resin, polyester resin, a polyurethane resin, melamine resin, polyamide resin, alkyd resin, a xylene resin, a urea-resin, and hydroxy styrene resin are mentioned. In the case of the large resin of these cohesive energies, it becomes large, and the mechanical strength of the picture section which the hydrophobic resin emitted from the microcapsule by heat builds is presumed to have contributed to improvement in ****-proof. There is only the one above atomic group and ****-proof of the low polystyrene of a cohesive energy, a polymethyl methacrylate, polyethylene, a polybutadiene, and a polyvinyl chloride is also low.

[0014] What plasticizes at once as a hydrophobic resin at the time of the heat rise of laser writing, and is hardened at the time of cooling is more desirable. It is more desirable if it is the resin which furthermore constructs a bridge with heat. The resin which has thermal reaction nature machines, such as an epoxy group and a MECHIRORU machine, from this is desirable. The hydrophobic resin which has a thermal reaction nature machine performs crosslinking reaction or self-crosslinking reaction with the compound with which the compound generated by the chemical decomposition of a capsule wallplate, a binder resin, a distributed resin, or others was added.

[0015] As a method of *****ing such a hydrophobic resin, the well-known *****ing method is applicable. for example, as the manufacture method of a microcapsule The method using the coacervation seen by U.S. JP,2800457,B and said 2800458 numbers, British JP,990443,B, U.S. JP,3287154,B, JP,38-19574,B, The method by the interfacial polymerization seen by 42-446 and 42-711, The method by the deposit of polymer found by U.S. JP,3418250,B and said 3660304 numbers, The method using the charge of an isocyanate polyol wallplate looked at by U.S. JP,3796669,B, The method using the charge of an isocyanate wallplate looked at by U.S. JP,3914511,B, The urea-formaldehyde system seen by U.S. JP,4001140,B, said 4087376 numbers, and said 4089802 numbers or the method using urea formaldehyde-resorcinol system wall formation material, The melamine formaldehyde resin seen by U.S. JP,4025445,B, The method,

JP,36-9163,B using wallplates, such as a hydroxy cellulose Although there is an electrolysis distribution cooling method seen by the spray drying process seen by the in situ method by the monomer polymerization seen by 51-9079, British JP,930422,B, and U.S. JP,3111407,B, British JP,952807,B, and said 967074 numbers It is not limited to these.

[0016] The desirable microcapsule wall used for this invention has 3-dimensional bridge formation, and has the property to swell with a solvent. From such a viewpoint, the poly urea, polyurethane, polyester, a polycarbonate, polyamides, and such mixture of the wallplate of a microcapsule are desirable, and the poly urea and its polyurethane are especially desirable. You may introduce into a microcapsule wall the compound which has a thermal reaction nature functional group.

[0017] Although the mean particle diameter of the above-mentioned microcapsule has desirable 0.01-20 micrometers, especially, its 0.05-2.0 micrometers are still more desirable, and especially its 0.10-1.0 micrometers are desirable. Within the limits of this, it passes with good resolution and the Tokiyasu quality is acquired.

[0018] The addition to the sensible-heat layer of a microcapsule is solid-content conversion, and is 15 - 40 % of the weight still more preferably ten to 60% of the weight preferably. Simultaneously with good on-board development nature, good sensitivity and ****-proof are obtained within the limits of this.

[0019] When adding a microcapsule in a sensible-heat layer, the solvent which an endocyst object dissolves and a wallplate swells can be added in a microcapsule dispersion medium. Diffusion out of the microcapsule of the compound which has the thermal reaction nature functional group by which the endocyst was carried out with such a solvent is promoted. As such a solvent, although it is dependent on the quality of the material of a microcapsule dispersion medium and a microcapsule wall, wall thickness, and an endocyst object, it can choose from the solvent with which many are marketed easily. For example, in the case of the water-dispersion microcapsule which consists of a bridge formation poly urea and a polyurethane wall, alcohols, ether, acetals, ester, ketones, polyhydric alcohol, amides, amines, and fatty acids are desirable.

[0020] As a concrete compound, although there is a methanol, ethanol, 3rd butanol, n-propanol, tetrahydrofuran, methyl-lactate, ethyl-lactate, methyl-ethyl-ketone, propylene-glycol-monomethyl-ether, ethylene glycol diethylether, ethylene-glycol-monomethyl-ether, gamma-butyl lactone, N,N-dimethylformamide, N, and N-dimethylacetamide etc., it is not restricted to these. Moreover, you may use two or more sorts of these solvents.

[0021] Although it does not dissolve in microcapsule distribution liquid, the solvent which will dissolve if the aforementioned solvent is mixed can also be used. Although an addition is decided by combination of a material, usually, 5 - 95% of the weight of application liquid is desirable, the more desirable range is 10 - 90 % of the weight, and especially the desirable range is 15 - 85 % of the weight.

[0022] In the sensible-heat layer of this invention, you may add a hydrophilic resin. The film strength of about [that on-board development nature becomes good] and the sensible-heat layer itself also improves by adding a hydrophilic resin. As a hydrophilic resin, what has hydrophilic groups, such as a hydroxyl, a carboxyl group, a hydroxyethyl machine, a hydroxypropyl machine, an amino group, an aminoethyl machine, an aminopropyl machine, and a carboxymethyl machine, for example is desirable.

[0023] As an example of a hydrophilic resin, gum arabic, casein, gelatin, a starch derivative, A carboxymethyl cellulose and its sodium salt, a cellulose acetate, A sodium alginate, vinyl acetate-maleic-acid copolymers, and styrene-maleic-acid copolymers Polyacrylic acids and those salts, polymethacrylic acids, and those salts, The homopolymer and copolymer of hydroxyethyl methacrylate, The homopolymer and copolymer of the homopolymer of hydroxyethyl acrylate and a copolymer, and hydroxypropyl methacrylate, The homopolymer and copolymer of hydroxypropyl acrylate, The homopolymer and copolymer of hydroxy butyl methacrylate, The homopolymer of hydroxy butyl acrylate and a copolymer, and polyethylene glycols The degree of hydrolysis in hydroxy propylene polymer, polyvinyl alcohol, and a row At least 60 % of the weight, Preferably At least 80% of the weight of a hydrolysis polyvinyl acetate, The homopolymer of a polyvinyl formal, a polyvinyl butyral, a polyvinyl pyrrolidone, and an acrylamide and a copolymer, the homopolymer of methacrylamide and polymer, the homopolymer of N-methylol acrylamide, a copolymer, etc. can be mentioned.

[0024] 5 - 40% of the weight of the photosensitive-layer solid content of the addition to the sensible-heat layer of a hydrophilic resin is desirable, and its 10 - 30 % of the weight is still more desirable. Within the limits of this, good on-board development nature and a good film strength are obtained.

[0025] Since the sensible-heat layer of this invention raises sensitivity, it can contain the light-and-heat conversion agent which absorbs infrared radiation and generates heat. As this light-and-heat conversion agent, various pigments, colors, and metal particles can be used that what is necessary is just the 700-1200nm optical-absorption matter which has an absorption band in part at least.

[0026] As a pigment, the pigment of the infrared-absorption nature indicated by a commercial pigment and a Color Index (C. I.) handbook, the "newest pigment handbook" (volume on Japanese pigment technical association, 1977 annual publications), the "newest pigment applied technology" (CMC publication, 1986 annual publications), and "printing ink technology" (CMC publication, 1984 annual publications) can be used.

[0027] Since these pigments raise the dispersibility over the layer added, well-known surface treatment can be performed and used for them if needed. In the method of surface treatment, the method of carrying out the surface coat of a hydrophilic resin or the lipophilic property resin, the method to which a surfactant is made to adhere, the method of combining the active substance (for example, a silica sol, an alumina sol, a silane coupling agent, an epoxy compound, an isocyanate compound, etc.) with a pigment front face, etc. can be considered. The pigment added in the layer of a hydrophilic property has that desirable to which the coat of the front face was carried out by the hydrophilic resin or the silica sol so that it may be easy to distribute with a water-soluble resin and a hydrophilic property may not be spoiled. As for the particle size of a pigment, it is desirable that it is in the range of 0.01 micrometers - 1 micrometer, and it is still more desirable that it is in the range which is 0.01 micrometers - 0.5 micrometers. As a method of distributing a pigment, the well-known distributed technology used for ink manufacture, toner manufacture, etc. can be used. As a desirable pigment, carbon black can be mentioned especially.

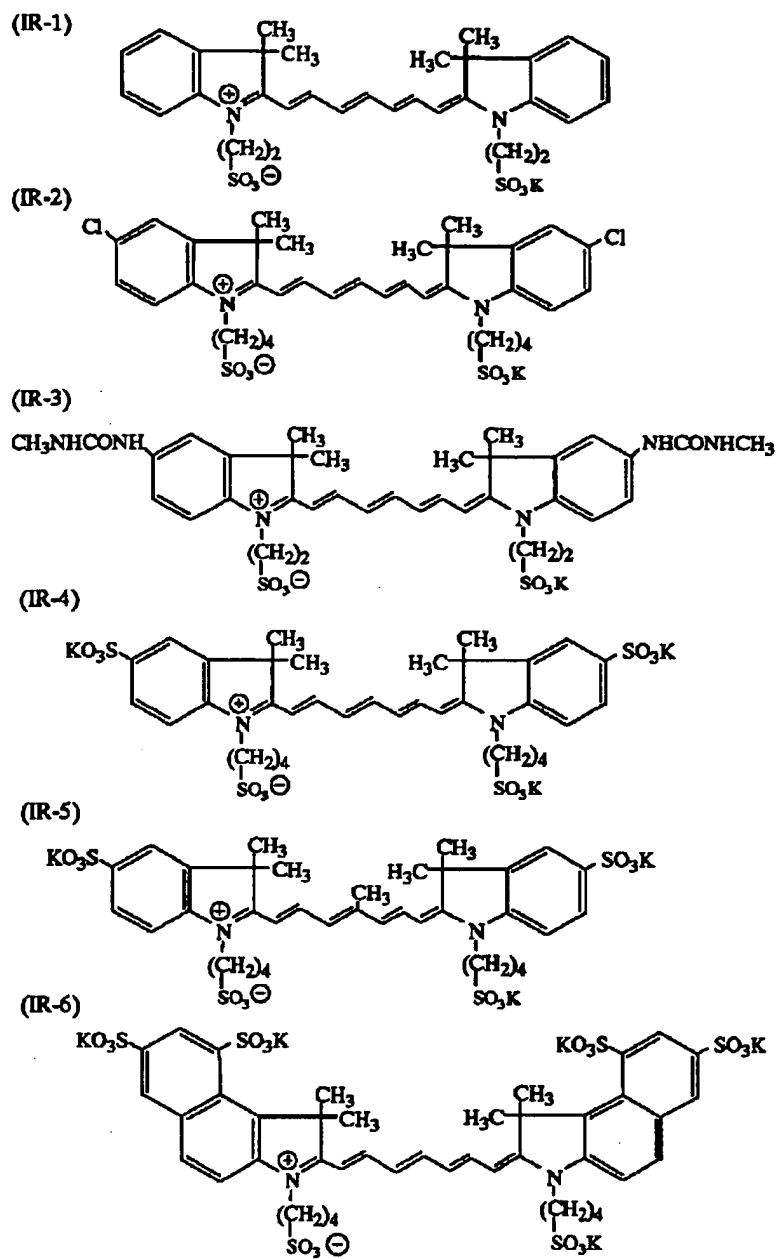
[0028] as a color, the well-known color indicated by a commercial color and reference (for example, development of the functionality coloring matter of the 90s, and the "near-infrared absorption coloring matter" "commercial-scene trend" chapter 2 2.3rd term (1990) -- CMC), or the patent can be used [of "color handbook" Society of Synthetic Organic Chemistry, Japan edit, Showa 45 annual publications, and "chemical-industry" 1986 year 5 month number P.45-51] Specifically, infrared-absorption colors, such as azo dye, metallic complex azo dye, pyrazolone azo dye, an anthraquinone dye, a phthalocyanine dye, a cull BONIUMU color, a quinonimine dye, the poly methine dye, and cyanine dye, are desirable.

[0029] Furthermore, for example, JP,58-125246,A, JP,59-84356,A, Cyanine dye, JP,58-173696,A which are indicated by JP,60-78787,A etc., The methine dye indicated by JP,58-181690,A, JP,58-194595,A, etc., JP,58-112793,A, JP,58-224793,A, JP,59-48187,A, The naphthoquinone color indicated by JP,59-73996,A, JP,60-52940,A, JP,60-63744,A, etc., The SUKUWARIRIUMU color indicated by JP,58-112792,A etc., Cyanine dye given in British JP,434,875,B, and a color given in U.S. Pat. No. 4,756,993, Cyanine dye given in U.S. Pat. No. 4,973,572, a color given in JP,10-268512,A, and a phthalocyanine compound given in JP,11-235883,A can be mentioned.

[0030] Moreover, a near-infrared absorption sensitizer given in U.S. Pat. No. 5,156,938 is also suitably used as a color. Moreover, the ARIRUBENZO (thio) pyrylium salt by which the U.S. Pat. No. 3,881,924 publication was replaced, TORIME tin thia pyrylium salt given in JP,57-142645,A, JP,58-181051,A, 58-220143, 59-41363, 59-84248, The pyrylium system compound indicated by 59-84249, 59-146063, and 59-146061, Pentamethine thio pyrylium salt etc. and JP,5-13514,B given in cyanine dye given in JP,59-216146,A, and U.S. Pat. No. 4,283,475, the pyrylium compound currently indicated by the 5-19702 official report and the product made from EPORIN -- EPORAITO III-178, EPORAITO III-130, and EPORAITO III-125 grade are also used preferably A color desirable in these, although it adds in the hydrophilic matrices in the hydrophilic resin of a sensible-heat layer etc. is a water soluble dye, and shows an example below.

[0031]

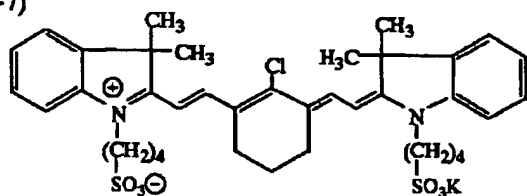
[Formula 1]



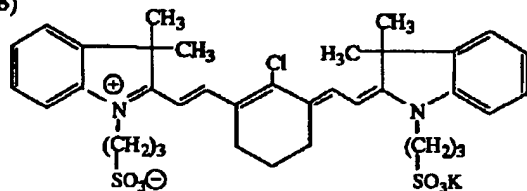
[0032]

[Formula 2]

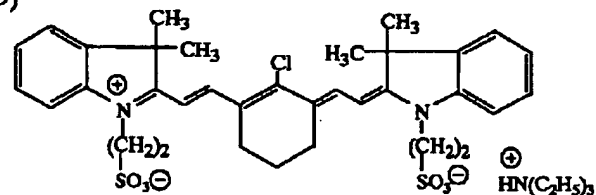
(IR-7)



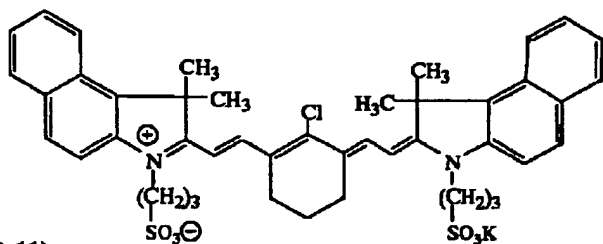
(IR-8)



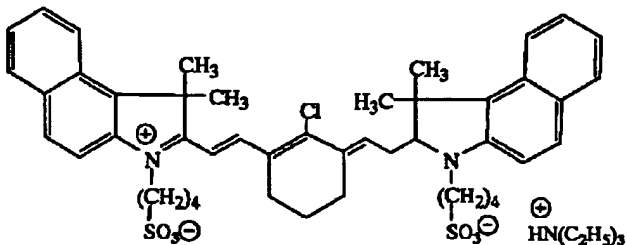
(IR-9)



(IR-10)



(IR-11)

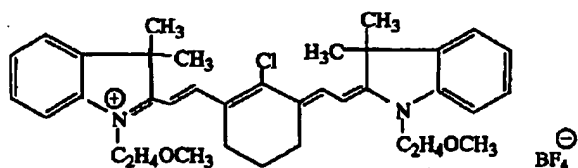


[0033] Although you may be the aforementioned infrared-absorption color as a light-and-heat conversion agent added in [, such as inside of the microcapsule of the sensible-heat layer of this invention,] the lipophilic property matter, the color of lipophilic property is more desirable. The following colors can be mentioned as an example.

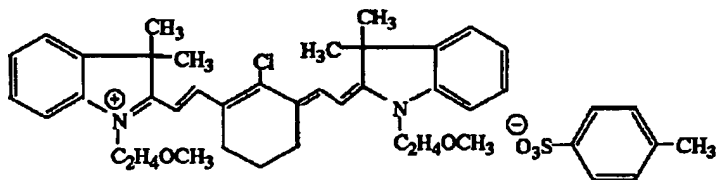
[0034]

[Formula 3]

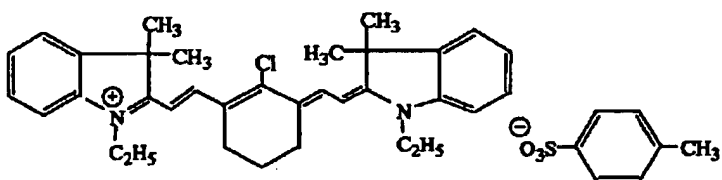
(IR-21)



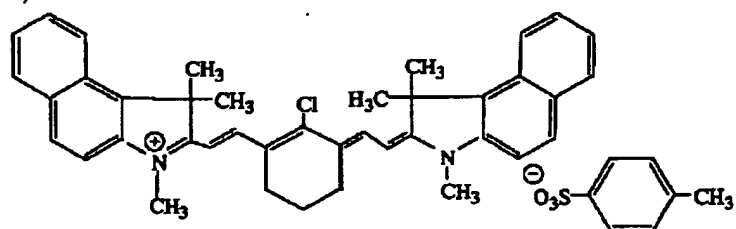
(IR-22)



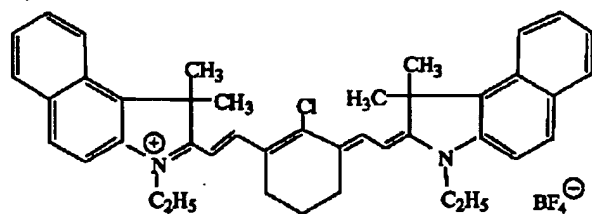
(IR-23)



(IR-24)

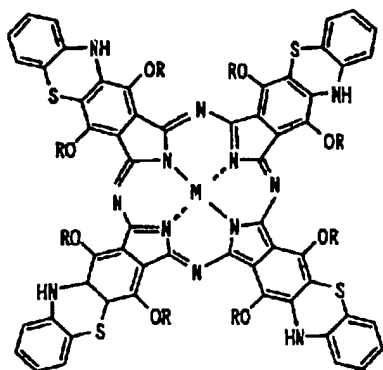


(IR-25)

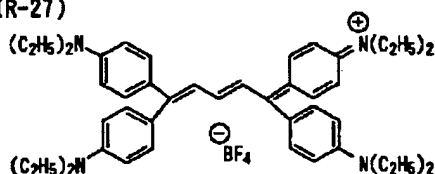


[0035]

[Formula 4]

(IR-26) $M=VO$, $R=1-C_6H_{11}$ 

(IR-27)



[0036] The light-and-heat conversion agent of the above-mentioned organic system can be added to 30 % of the weight in a sensible-heat layer. It is 5 - 25 % of the weight preferably, and is 7 - 20 % of the weight especially preferably. Good sensitivity is obtained within the limits of this.

[0037] A metal particle can also be used for the sensible-heat layer of this invention as a light-and-heat conversion agent. Many of metal particles are light-and-heat conversion nature, and it is also self-febrility. As a desirable metal particle, the particle of the simple substance of Si, aluminum, Ti, V, Cr, Mn, Fe, Co, nickel, Cu, Zn, Y, Zr, Mo, Ag, Au, Pt, Pd, Rh, In, Sn, W, Te, Pb, germanium, Re, and Sb, alloys or those oxides, and a sulfide is mentioned. The melting points a metal desirable also in the metal which constitutes these metal particles tends to carry out [the melting points] heat weld by optical irradiation are infrared rays and the metal which has absorption in visible or an ultraviolet-rays field, for example, Re, Sb, Te, Au, Ag, Cu, germanium, Pb, and Sn, below about 1000 degrees C. Moreover, especially a desirable thing is the particle of a metal also with comparatively high melting point and absorbance [as opposed to / it is comparatively low and / a heat ray], for example, Ag, Au, Cu, Sb, germanium, and Pb, and, especially as for a desirable element, Ag, Au, and Cu are mentioned.

[0038] Moreover, you may consist of two or more sorts of light-and-heat conversion matter, such as carrying out mixed use of the particle of low melting point metals, such as Re, Sb, Te, Au, Ag, Cu, germanium, Pb, and Sn, and the particle of self-febrility metals, such as Ti, Cr, Fe, Co, nickel, W, and germanium, for example. Moreover, when it considers as minute pieces, such as Ag, Pt, and Pd, especially the thing to use combining the minute piece of a large metal kind and other metal minute pieces has a desirable optical absorption.

[0039] The particle of the metal simple substance stated above and an alloy is a book by hydrophilic-property--ization-processing a front face. The means of the formation of a surface hydrophilic property can be hydrophilic, surface treatment can be carried out with the compound which has the adsorptivity to a particle, for example, a surfactant, surface treatment can be carried out by the constituent of a particle, and the matter with the hydrophilic radical which reacts, or methods, such as preparing the hydrophilic macromolecule coat of protective colloid nature, can be used. Especially a desirable thing is surface silicate processing, for example, in the case of an iron particle, a front face can fully be hydrophilic-property-ized by the method immersed in 70-degree C sodium-silicate (3%) solution for 30 seconds. Other metal particles can perform surface silicate processing by the same method.

[0040] 10 micrometers or less of 0.003-5 micrometers of particle size of these particles are 0.01-3

micrometers especially preferably more preferably. Good sensitivity and good resolution are obtained within the limits of this.

[0041] In this invention, when using these metal particles as a light-and-heat conversion agent, the addition is 10% of the weight or more of a sensible-heat layer solid content preferably, and is especially used at 30 % of the weight or more preferably 20% of the weight or more. High sensitivity is obtained within the limits of this.

[0042] Content of the above-mentioned light-and-heat conversion agent may be the below-mentioned undercoat and below-mentioned water-soluble overcoat layer which are an adjacent layer of a sensible-heat layer. When at least one layer contains a light-and-heat conversion agent among a sensible-heat layer, undercoat, and an overcoat layer, infrared-absorption efficiency increases and sensitivity can be improved.

[0043] In the sensible-heat layer of this invention, you may add various compounds if needed in addition to the above further. For example, in order to raise print durability further, polyfunctional monomer can be added in a sensible-heat layer matrix. What was illustrated as this polyfunctional monomer as a monomer into which it is put into a microcapsule can be used. Trimethylolpropane triacrylate can be especially mentioned as a desirable monomer.

[0044] Moreover, after image formation, since distinction of the picture section and the non-picture section is made easy to attach, the color which has big absorption in a light region can be used for the sensible-heat layer of this invention as a coloring agent of a picture. Specifically Oil yellow #101, oil yellow #103, oil pink #312, the oil green BG An oil blue BOS, oil-blue #603, oil black BY, Oil black BS, oil black T-505 (above product made from Orient Chemical industry), Victoria pure blue, a Crystal Violet (CI42555), Colors indicated by JP,62-293247,A, such as a Methyl Violet (CI42535), ethyl violet, Rhodamine B (CI145170B), a Malachite Green (CI42000), and a methylene blue (CI52015), can be mentioned. Moreover, pigments, such as a phthalocyanine system pigment, an azo system pigment, and titanium oxide, can also be used suitably. 0.01 - 10 % of the weight of an addition is desirable to a sensible-heat layer application liquid total solid.

[0045] Furthermore, if needed, in order to give the flexibility of a paint film etc., a plasticizer can be added to the sensible-heat layer of this invention. For example, a polyethylene glycol, a tributyl citrate, a diethyl phthalate, dibutyl phthalate, a phthalic-acid dihexyl, a dioctyl phthalate, tricresyl phosphate, tributyl phosphate, trioctyl phosphate, a tetrahydrofurfuryl oleate, etc. are used.

[0046] The sensible-heat layer of this invention dissolves or distributes each required above-mentioned component to a solvent, prepares application liquid, and is applied. As a solvent used here, ethylene dichloride, a cyclohexanone, A methyl ethyl ketone, a methanol, ethanol, propanol, an ethylene glycol monomethyl ether, 1-methoxy-2-propanol, 2-methoxy ethyl acetate, 1-methoxy-2-propyl acetate, dimethoxyethane, a methyl lactate, Although ethyl-lactate, N, and N-dimethylacetamide, N,N-dimethylformamide, a tetramethyl urea, N-methyl pyrrolidone, dimethyl sulfoxide, a sulfolane, gamma-butyl lactone, toluene, water, etc. can be mentioned, it is not limited to this. these solvents are independent -- or it is mixed and used The solid-content concentration of application liquid is 1 - 50 % of the weight preferably.

[0047] Moreover, although the sensible-heat layer coverage on the base material obtained after an application and dryness (solid content) changes with uses, generally its 0.5 - 5.0 g/m² is desirable. Various methods can be used as a method of applying. For example, a bar coating-machine application, a rotation application, a spray application, a curtain application, a DIP application, an air knife application, a blade application, a roll application, etc. can be mentioned.

[0048] In the sensible-heat layer application liquid in connection with this invention, the surfactant for improving application nature, for example, a fluorochemical surfactant which is indicated by JP,62-170950,A, can be added. a desirable addition -- 0.01- of a sensible-heat layer total solid -- it is 0.05 - 0.5 % of the weight still more preferably 1% of the weight

[0049] The negative for lithography of this invention can prepare a water-soluble overcoat layer on a sensible-heat layer because of the pollution control of the sensible-heat layer front face by the lipophilic property matter. The water-soluble overcoat layer used for this invention can be easily removed at the

time of printing, and contains the resin chosen from the water-soluble organic high molecular compound.

[0050] As a water-soluble organic high molecular compound used here The coat made by application dryness is what has film organization potency. specifically Polyvinyl acetate (however, thing of 65% or more of adding-water cracking severity), a polyacrylic acid, The alkali-metal salt or an amine salt, a polyacrylic-acid copolymer, its alkali-metal salt, or an amine salt, A polymethacrylic acid, its alkali-metal salt or an amine salt, a polymethacrylic-acid copolymer, The alkali-metal salt or an amine salt, a polyacrylamide, its copolymer, Polyhydroxy ethyl acrylate, a polyvinyl pyrrolidone, its copolymer, A polyvinyl methyl ether, a vinyl methyl ether / maleic-anhydride copolymer, A Polly 2-acrylamide-2-methyl-1-propane sulfonic acid, The alkali-metal salt or an amine salt, a Polly 2-acrylamide-2-methyl-1-propane sulfonic-acid copolymer, The alkali-metal salt or an amine salt, gum arabic, a fibrin derivative Its (carboxymethyl cellulose, carboxy ethyl cellulose, methyl cellulose, etc. and denaturation) object A white dextrin, a pullulan, a zymolysis etherification dextrin, etc. can be mentioned. [for example,] Moreover, according to the purpose, two or more sorts can be mixed and these resins can also be used.

[0051] Moreover, in an overcoat layer, you may add the aforementioned water-soluble light-and-heat conversion agent. Furthermore, in a solution application, non-ion system surfactants, such as the polyoxyethylene nonylphenyl ether and polyoxyethylene dodecylether, can be added for the purpose which secures the homogeneity of an application to an overcoat layer. The dryness coverage of an overcoat layer has desirable 0.1 - 2.0 g/m². Within the limits of this, on-board development nature is not spoiled but a pollution control with the good sensible-heat layer front face by lipophilic property matter, such as fingerprint adhesion dirt, is made.

[0052] In the negative for lithography of this invention as a hydrophilic base material which can apply the aforementioned sensible-heat layer It is a tabular object stable in dimension. For example, paper, plastics The paper (which for example, polyethylene, polypropylene, polystyrene, etc. laminated), Metal plates (for example, aluminum, zinc, copper, etc.), plastic film for example, a diacetyl cellulose, a cellulose triacetate, and a cellulose propionate -- A butanoic acid cellulose, a cellulose acetate butyrate, a cellulose nitrate, a polyethylene terephthalate, The metal like the above, such as polyethylene, polystyrene, polypropylene, a polycarbonate, and a polyvinyl acetal, is mentioned for a lamination, the paper by which vacuum evaporatio~~no~~ was carried out, or plastic film. Polyester film or an aluminum plate is mentioned as a desirable base material.

[0053] This aluminum plate makes a pure-aluminium board and aluminum a principal component, it is an alloy board containing the different element of a minute amount, and plastics laminates it in the thin film of aluminum or an aluminium alloy further. There are silicon, iron, manganese, copper, magnesium, chromium, zinc, a bismuth, nickel, titanium, etc. in the different element contained in an aluminium alloy. The content of the different element in an alloy is at most 10 or less % of the weight. However, the aluminum plate of the material of well-known official business can also be conventionally used for the aluminum plate applied to this invention suitably.

[0054] The thickness of the above-mentioned substrate used by this invention is 0.15mm - 0.3mm especially preferably 0.1mm - 0.4mm preferably 0.05mm - 0.6mm.

[0055] It is desirable to precede using an aluminum plate and to carry out surface treatment, such as split-face-izing of a front face and anodic oxidation. With surface treatment, the improvement in a hydrophilic property and adhesive reservation with a sensible-heat layer become easy.

[0056] Although split-face-ized processing on the front face of an aluminum plate is performed by various methods, it is performed by the method of split-face-izing mechanically, for example, the method of forming a front face into a dissolution split face electrochemically, and the method of carrying out the selective dissolution of the front face chemically. As the mechanical method, well-known methods, such as the ball grinding method, a brushing method, the blast grinding method, and buffing, can be used. The method of flooding with the saturated-water solution of the aluminum salt of a mineral acid which is indicated by JP,54-31187,A as the chemical method is suitable. Moreover, there is the method of performing by an alternating current or direct current in the electrolytic solution which contains acids, such as a hydrochloric acid or a nitric acid, as an electrochemical split-face-ized method.

Moreover, the electrolysis split-face-ized method using the mixed acid can also be used as indicated by JP,54-63902,A.

[0057] As for split-face-izing by the method like the above, it is desirable to be given in the range from which (Ra) is set to 0.2-1.0 micrometers in the center line average coarseness of the front face of an aluminum plate. Anodizing is performed, in order that the split-face-ized aluminum plate may raise abrasion resistance by request, after alkali etching processing is carried out using solution, such as a potassium hydroxide and a sodium hydroxide, if needed and neutralization processing is carried out further. As an electrolyte used for anodizing of an aluminum plate, use of the various electrolytes which form a porosity oxide film is possible, and, generally a sulfuric acid, a hydrochloric acid, oxalic acid, chromic acids, or those mixed acids are used. The concentration of those electrolytes is suitably decided according to an electrolytic kind. Although it cannot generally specify since the processing conditions of anodic oxidation change variously with the electrolyte to be used, if electrolytic concentration is 5-70 degrees C, current density 5 - 60 A/dm², voltage 1-100V, and a range for 10 seconds - electrolysis time 5 minutes, generally it is suitable for a 1 - 80-% of the weight solution, and solution temperature. As for the amount of oxide films formed, it is desirable 1.0 - 5.0 g/m² and that it is especially 1.5 - 4.0 g/m².

[0058] As a base material which has the hydrophilic front face used by this invention the substrate which is carried out in the above surface treatment and has an anodic oxide film -- for much more improvement of adhiathermancy etc. in an adhesive property with the upper layer, a hydrophilic property, and the difficulty of becoming dirty, although you may remain as it is If needed, expansion processing of the micro pore of the anodic oxide film indicated by the application for patent No. 65219 [2000 to] and the application for patent No. 143387 [2000 to], sealing of a micro pore, surface hydrophilicity-ized processing in which it is immersed in the solution containing a hydrophilic compound, etc. can be chosen suitably, and can be performed. As a suitable hydrophilic compound for the above-mentioned hydrophilicity-ized processing, polyvinyl phosphonic acid, a compound with a sulfonic group, a saccharide compound, a citric acid, alkali-metal silicate, a zirconium fluoride potassium, phosphate / inorganic fluorine compound, etc. can be mentioned.

[0059] When using polyester film as a base material of this invention, it is desirable to apply a hydrophilic layer and to make a front face into a hydrophilic property. The hydrophilic layer which comes to apply the application liquid containing the colloid of the oxide of at least one element chosen [application for patent / No. 10810 / 2000 to] / from the beryllium, the magnesium, the aluminum, the silicon, the titanium, the boron, the germanium, the tin, the zirconium, the iron, the vanadium, antimony, and transition metals of a publication as a hydrophilic layer or a hydroxide is desirable. The hydrophilic layer which comes to apply the application liquid containing the colloid of the oxide of silicon or a hydroxide especially is desirable.

[0060] In this invention, before applying a sensible-heat layer, inorganic undercoat like a water-soluble metal salt or organic undercoat, such as boric-acid zinc, may be prepared if needed.

[0061] As an organic compound used for this organic undercoat For example, a carboxymethyl cellulose, a dextrin, gum arabic, The polymer which has a sulfonic group in a side chain and a copolymer, a polyacrylic acid, The phosphonic acid which has amino groups, such as 2-aminoethyl phosphonic acid, the phenylphosphonic acid which may have a substituent, Organic phosphonic acid, such as naphthyl phosphonic acid, alkyl phosphonic acid, glycerol phosphonic acid, a methylene diphosphonic acid, and an ethylene diphosphonic acid, Organic phosphoric acids, such as a phenyl phosphoric acid which may have a substituent, a naphthyl phosphoric acid, an alkyl phosphoric acid, and glycerophosphoric acid, Phenyl phosphinic acid, naphthyl phosphinic acid which may have a substituent, Although chosen out of the hydrochloride of the amine which has hydroxyls, such as amino acid, such as organic phosphinic acid, such as an alkylphosphine acid and glycerol phosphinic acid, a glycine, and beta-alanine, and a hydrochloride of a triethanolamine, a yellow color, etc., two or more sorts may be mixed and you may use. Moreover, you may make this undercoat contain the aforementioned light-and-heat conversion agent.

[0062] This organic undercoat can be prepared by the following methods. That is, on an aluminum plate, it applies and dries and the solution made to dissolve the above-mentioned organic compound in organic

solvents, such as water or a methanol, ethanol, and a methyl ethyl ketone, or those partially aromatic solvents is prepared. The solution of 0.005 - 10 % of the weight of concentration of the above-mentioned organic compound can be applied by various methods. For example, a bar coating-machine application, a rotation application, a spray application, a curtain application, etc. may use which method. The amount of covering after dryness of organic undercoat has desirable 2 - 200 mg/m², and it is 5 - 100 mg/m² more preferably.

[0063] Image formation of the negative for lithography of this invention is carried out by heat. Specifically, although high illuminance flash exposure, such as direct picture Mr. record, scanning exposure by the infrared laser, and a xenon electric-discharge lamp, infrared-lamp exposure, etc. by the heat recording head etc. are used, exposure by solid-state high power infrared laser which emits infrared radiation with a wavelength of 700-1200nm, such as semiconductor laser and an YAG laser, is suitable. A printing machine can be equipped without processing beyond it with the negative for lithography of this invention by which picture exposure was carried out, and it can be printed in the usual procedure using ink and dampening water. Moreover, it is also possible to expose these negatives for lithography with the laser carried in the printing machine after attaching on a printing machine cylinder as indicated by Japanese JP,2938398,B, and to attach and carry out on-board development of dampening water and/or the ink after that. Moreover, after these negatives for lithography carry out development which makes water or suitable solution a developer, they can also be used for printing.

[0064]

[Example] Hereafter, although an example explains this invention in detail, this invention is not limited to these.

[0065] as the synthetic-oil phase component of a microcapsule (1) -- epoxy resin Epicoat 1003 (product made from oil-ized shell epoxy) 30g, adduct D110N(Takeda Chemical Industries make)30g of a trimethylol propane and a xylylene diisocyanate, and a light-and-heat conversion agent (IR-26 [given / this / in a specification]) -- 8g and the anion system surfactant (pie ONINA41made from Takemoto fats and oils C) were dissolved in 90g of ethyl acetate As an aqueous-phase component, 180g of polyvinyl alcohol (Kuraray PVA217E) 4% solution was prepared. The oil phase component and the aqueous-phase component were emulsified by 10000rpm using the homogenizer. Thus, the solid-content concentration of the obtained microcapsule liquid was 18%, and the mean particle diameter was 0.4 micrometers.

[0066] 30g [of horse mackerel peat system urethane resins which kneaded the polybutylene horse mackerel peat glycols (number average molecular weight 1000) 800g and 4 and 4'-diphenylmethane diisocyanate 200g at 70 degrees C by the kneader, and were obtained as a synthetic-oil phase component of a microcapsule (2)] D 110Ns 30g and a light-and-heat conversion agent (IR-26) -- 8g and pie ONINA41C 0.5g was dissolved in 70g [of ethyl acetate], and acetonitrile 20g. Hereafter, the microcapsule (2) was compounded like the synthetic example of the aforementioned microcapsule (1). Solid-content concentration was 18% and the mean particle diameter was 0.6 micrometers.

[0067] as the synthetic-oil phase component of a microcapsule (3) -- thermoplastic alkylphenol modified resin HP-70 (Mitsubishi Gas Chemical Co., Inc. make) 6.0g, D110N(Takeda Chemical Industries make) 30g, and a light-and-heat conversion agent (IR-26) -- 8g and pie ONINA41C 0.5g was dissolved in 90g of ethyl acetate. Hereafter, the microcapsule (3) was compounded like the synthetic example of the aforementioned microcapsule (1). Solid-content concentration was 18% and the mean particle diameter was 0.8 micrometers.

[0068] as the synthetic-oil phase component of a microcapsule (4) -- thermosetting novolak-resin NP-100 (Mitsubishi Gas Chemical Co., Inc. make) 6.0g and D110N 30g and a light-and-heat conversion agent (IR-26) -- 8g and pie ONINA41C 0.5g was dissolved in 90g of ethyl acetate. Hereafter, the microcapsule (4) was compounded like the synthetic example of the aforementioned microcapsule (1). Solid-content concentration was 18% and the mean particle diameter was 0.7 micrometers.

[0069] as the synthetic-oil phase component of the microcapsule for comparison (5) -- 6.0g [of polystyrene resin of weight average molecular weight 10000] D 110Ns 30g and a light-and-heat conversion agent (IR-26) -- 8g and pie ONINA41C 0.5g was dissolved in 90g of ethyl acetate. Hereafter, the microcapsule for comparison (5) was compounded like the synthetic example of the

aforementioned microcapsule (1). Solid-content concentration was 18% and the mean particle diameter was 0.3 micrometers.

[0070] The aluminum plate of 0.3mm in example thickness of manufacture of a base material and the quality of the material JIS A 1050 was often washed with water, after graining the front face using the water suspension of a No. 8 nylon brush and PAMISUTON of 800 meshes. After etching by dipping this board in sodium-hydroxide solution for 60 seconds at 70 degrees C 10%, it rinsed with the stream, and neutralization washing was carried out with the nitric acid 20 more%, and, subsequently it rinsed. Quantity of electricity performed electrolysis split-face-ized processing for this in 1% nitric-acid solution using the police box wave current of a sine wave at the time of the anode plate of 300 C/dm² under the conditions of $V_a=12.7V$. When the surface roughness of an aluminum plate was measured, it was 0.45 micrometers (Ra display). After DESUMATTO [being succeedingly immersed into 30% sulfuric-acid solution and / 55 degrees C] for 2 minutes, direct-current electrolysis was carried out for 45 seconds with the current density of 5 A/dm² in 33 degrees C and 15% sulfuric acid, and the anodic oxide film was formed. In order to expand the micro pore of the generated anodic oxide film, after being immersed for 1 minute into 60-degree C 50 g/l sulfuric acid, further, it processed for 12 seconds, 70 degrees C carried out rinsing dryness in the 2.5 % of the weight solution of sodium silicates, and the base material (I) was obtained.

[0071] Drying the following sensible-heat layer application liquid on 60-degree-C conditions for 120 seconds in oven after the bar application on the base material (I) obtained in the example of the example 1 above-mentioned manufacture, the dryness coverage produced the lithography original edition of 1 g/m².

[0072] Sensible-heat layer application **** 70g methoxypropane Norian 30g microcapsule (1) 5g polyhydroxy ethyl acrylate 0.5g (weight average molecular weight 25000) p-diazo diphenylamine sulfate 0.2g. [0073] Thus, after exposing the obtained lithography version on condition that output 9W, outside drum rotational frequency 105rpm, printing plate energy 200 mJ/cm², and resolution 2400dpi in Trendsetter3244VFS made from Creo which carried water cooling type 40W infrared semiconductor laser, attaching in the cylinder of printing machine SOR-M made from high DERUBERUGU and supplying dampening water, without processing, it printed by supplying ink. Consequently, on-board development could be carried out satisfactory and good printed matter was obtained to 20,000 sheets.

[0074] Except having changed into the microcapsule (2) in the example 2, and having changed the microcapsule (1) of two to example 3 example 1 into the microcapsule (3) in the example 3, the original edition was created by the same application liquid and the coverage, and same exposure and printing were carried out. As a result, on-board development could be carried out satisfactory, and good printed matter was obtained to 20,000 sheets, respectively.

[0075] Except having changed the microcapsule (1) of example 4 example 1 into the microcapsule (4), the original edition was created by the same application liquid and the coverage, and same exposure and printing were carried out. As a result, on-board development could be carried out satisfactory, and good printed matter was obtained to 30,000 sheets, respectively.

[0076] Except having changed the microcapsule (1) of example of comparison 1 example 1 into the microcapsule for comparison (5), the original edition was created by the same application liquid and the coverage, and same exposure and printing were carried out. Although on-board development was able to be carried out satisfactory as a result, printing number of sheets was two omasums.

[0077]

[Effect of the Invention] According to this invention, the platemaking by the scanning exposure based on the digital signal is possible, it has good on-board development nature, and the negative for lithography which was moreover excellent in ****-proof can be supplied.

[Translation done.]